

ABSTRACT OF THE DISCLOSURE

A plasma surface treatment system for irradiating a surface of a substrate to be treated with a nitrogen plasma excited by a high-frequency electric field to introduce nitrogen into the surface of the substrate comprises a pulse modulator for pulse modulation of the high-frequency electric field. By applying the high-frequency electric field in a pulsed form, it is possible to realize a nitriding by which the peak of nitrogen concentration is located at a shallower position and a desired nitrogen concentration can be obtained.